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DETERMINATION OF PEST COMPLEX OF OATS- *AVENA SATIVA* (L.) VAR. KENT AND THEIR STATUS

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ABSTRACT

Nine species of insects and unidentified specie of cyst nematode were recorded at various stages of crop growth on oats variety "Kent" under Kashmir conditions during Rabi 1999-2001 in district Baramullah Kashmir to devise an Integrated Pest Management (IPM) programme. Among various insect species only one specie of insects namely Army worm *Mythimna seperata* attained major and sporadic pest status, damaging seedlings, foliage and tender grains of the crop from IV week of May onwards with the rise in temperature above 28°C.Two species *viz*. *Lecanium viride* and *Hieroglyphus banian* attained a minor status from vegetative till harvesting stage. While the other pests associated with the crop were of minor and of stray importance.

Key words: Pest complex, oats, status.

Oats *Avena sativa* (L) is the fourth major crop of the world after wheat, rice and maize. This important fodder crop is extensively grown on the flat lands of mountainous tracts in the temperate regions. The crop is grown annually on an area of 0.1 millions hectares in J&K State. In spite of its intensive cultivation, the J&K state is deficit by 4 million tones of fodder on dry weight basis for its 5.8 million cattle population (Anonymous, 1989).To provide forage in early season when no other green fodder is available, oats can be accommodated easily under double cropping system immediately after vanishing the white snow carpet over the field crops. However, one of the important constraints in its cultivation is the infestation of the crop to a large number of insect pests at different stages of crop growth .In Kashmir, cultivation of improved oats varieties like "black nip" and "kent" and injudicious use of fertilizer have made this crop more susceptible to some insect pests. Several authors reported many insects attacking oats from different regions in Kashmir and Abroad (Malik *et al.* 1972; Fletcher 1917; Ghosh 1924; Bindra and Singh 1970 and Singh *et. al.* 1987)

In order to fix the priorities and for evolving suitable pest management practices, continuous review of the pest complex of oats crop under an agro climatic conditions is essential. Considering the growing need to devise an effective Pest management tactic, the present study which deals with various pests attacking oats at different crop stages was therefore undertaken at Regional Research Station Wadura, Kashmir.

MATERIALS AND METHODS

The oats var. "kent" was raised during rabi 1999- 2001 at Regional Research Station Wadura, Sopore Kashmir. By adopting production recommendations of SKUAST-K (Shalimar) under Kashmir conditions. The crop was observed weekly from seedling stage till harvest for the incidence of various insect pests and natural enemies during 7.00am-9.00am. After sowing of oats in the last week of October, white snow carpet remains over the crop during November-February. From March onwards absolute population of pests per sample (Pradhan, 1964) was recorded from randomly selected and predetermined samples in case of all insect pests and natural enemies. Each sample comprised one square feet area of oats crop and observations were recorded at weekly intervals from Nov-June and also frequent field visits were made in crop growing pockets to monitor the pest fauna of the crop in Districts Baramulla and Kupwara. Insect pests were identified both from the shoot and from the root systems of all the plants per square feet area (one sample). Also soil and root samples of 250 cc and 5 grams were washed respectively in clean water. After separating nematodes by Cobb's sieving and decanting method (Cobb 1918) from soil samples and by teasing 5 grams stained roots, nematodes were identified and counted under microscopic study. Similarly each species of insects were identified and counted separately from all the samples and finally average population of the respective pests per sample of

Table 1: Pest complex of oats with their status

S. No.	Common name	Scientific name	Family	Order	Status			Crop stage/ Nature of damage or parts where damage is caused
					1999	2000	2001	
1.	Army worm	Mythimna separata	Noctuidae	Lepidoptera	Minor	Major/ Sporadic	Minor	Leaves, seedlings, on tender grains
2.	Cut worm	Agrotis ipsilon	Noctuidae	Lepidoptera	Minor	Minor	Minor	Young seedlings, foilage
3.	Wheat aphid	*Schizaphis graminum*	Aphididee	Homopteras	Minor	Minor	Minor	Nymphs infesting foilage, sucking sap
4.	Plant bugs	Lecanium viride	Pentatomi-dae	Heteroptera	Minor	Minor	Minor	Adults infesting foilage, leaves,ears and grains
5.	Grass hoppers	Heiroglypus banian	Acrididae	Orthoptera	Stray	Stray	Stray	Leaves and stem
6.	Oat thrips	Stenothrips -graminun	Thripidae	Thysanop-tera	Stray	Stray	Stray	Adults and nymphs infesting foilage.
7.	Wire worms	*Agriotes spp.*	Elateridae	Coleoptera	Minor	Minor	Minor	Damaging roots inside soil.
8.	Cock chafers	*Melolantha spp.*	Scarabeid-ae	Coleoptera	Minor	Minor	Minor	White grubs in soil eating roots, destroying seedlings.
9.	Frit fly	Oscinella frit	Chloropid-ae	Diptera	Minor	Minor	Minor	Eating stem , popu. On leaves, mostly apical part
10.	Cyst nematodes	Heterodera specie	Heteroder-idae	Tylenchida	Minor	Stray	Minor	Little popu. found in root rhizosphere

Natural enemies associated with pest complex of oats :

Coccinelid beetle	*Coccinella septumpunctata*	Status			Crop stage
		Major	Major	Major	Seedling pod maturity
Ear wigs	Unidentified sp	Stray	Stray	Stray	Vegetative
Yellow wasps	Unidentified sp	Minor	Minor	Minor	Vegetative pod maturity
Tachina fly	Wenthamia sp	Minor	Stray	Stray	Pod maturity
Lace wing	Chrysoperla sp	Stray	Stray	Minor	Seedling-flowering

Table 2: Population of pests on oats/sample (1 square feet area) (Rabi-2000)

S.N.	Insect pest	Nov- Feb				Mar				April				May				June			
		I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
1.	Cut-worm (***Agrotis ipsilon***)	–	–	–	–	–	–	–	2	1	2	2	3	3	6	6	7	7	4	–	–
2.	Wheat aphid (*Schizaphis graminum*)	–	–	–	–	–	–	–	3	1	–	3	2	–	2	2	1	1	2	–	–
3.	Army worm (*Mythimna separata*)	–	–	–	–	–	–	–	–	4	6	8	10	14	14	16	22	25	26	–	–
4.	Plant bugs (*Lecanium viride*)	–	–	–	–	–	–	–	–	–	2**	2**	4**	3**	2**	6**	4**	6**	6**	–	–
5.	Grass hopper (*Heiroglypus banian*)	–	–	–	–	–	–	–	–	–	1**	1**	–	–	–	2**	2**	1**	2**	–	–
6.	Oat thrips (*Stenothrips graminum*)	–	–	–	–	–	–	–	–	–	–	1	1	–	1	–	2	1	1	–	–
7.	Wire worms (*Agriotes spp*)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	2–	1	3	–	–
8.	Cock chafers (*Melolantha spp)*	–	–	–	–	–	–	–	–	–	–	1	–	–	1	1	1	2	1	3	–
9.	Friut fly (*Oscinella frit)*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2**	2**	3**	3**	–	–
10.	Cyst nematodes (*Heterodera specie)*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	5	4	6	9	–	–

** = Adults.

the oats crop was calculated. The observations were recorded at weekly intervals from November to June and also frequent field visits were made to monitor the pest fauna of the crop around the area.

The insect species were categorized into major, minor, stray and sporadic pests. The insect pests which infested the crop continuously after their first appearances in considerable numbers were designated as major pests and those which occurred intermittently and their population never became high were categorized as minor pests. While the species whose occurrence was scarce and population was very low were designated as stray pests. Pests appearing once in field but in epidemic form were designated as sporadic pests.

Crop sample	=	No of crops along with the root/ Sq. feet area
Weekly average population = N/n	=	Total population of pest species of all the of pest species/sample plant samples/No of total samples Studied.
Average No of pest species/plant	=	Total pest species population in a sample/total No of plants in a sample.

RESULTS AND DISCUSSION

It has been found that oats var. "Kent" is infested with as many as nine insect pests at different stages of crop growth in an overlapsping manner, associated with five species of biotic agents regulating the pest population under agro climatic conditions prevailing around Regional Research Station in Baramulla and Kupwara,as presented in Table-1.

The oats crop was first found associated with *Agrotis ipsilon* in rhizosphere and *Schizaphis graminum* on foliage in the ending week of March.They were detected during vegetative to flowering stages till harvesting. The caterpillars of army worm*, Mythimna separate* attacked the crop from 1st week of April and attained peak from 4th week of May and become highly destructive, damaging leaves and stem portions with the rise in temperature above 28°C.The consequent increase in number of this pest also proved a voracious major potential pest, damaging all the parts of the plant *viz.* leaves, seedlings and tender grains. Table-2.

Two insect pests appearing as minor pests from vegetative till harvesting stage were *Lecanium viride* and *Hieroglyphus banian*. Other insect pests appearing as stray pests were *Stenothrips graminum* and *Melolantha spp.* from vegetative stage (IIIrd week of April) and *Agriotis* spp. And *Oscinella frit* from III week of May till grain formation. A cyst nematode *Heteodera spp.* was found associated in the rhizosphere of the crop as a stray pest.

Five natural enemies *viz*. *Coccinella septumpunctata*, earwigs, yellow wasps, Tachina fly and lace wings (unidentified) were associated with the pest complex in regulating the pest population in the field.

Among various insect and non insect pests associated with the crop, only one insect *Mythimna seperata* attained major and sporadic pest status during the year rabi 2000 and other insect pests associated with the crop were of minor and of stray importance.Table-2. During rabi 1999 and rabi 2001 the association of all the insects with the crop including *Mythimna separata were* of minor and of stray importance. The variation of the first study (rabi 1999) and last study (rabi 2001) with the study of Rabi 2000 is possibly due to annual changes in weather parameters. It is clear that temprature has an important role on the development of insect pests especially on the development of *Mythimna seperata*. Its out break in the form of plaque like a voracious status supports the report of Laurent 1955; Narayanan 1953 and Khan *et. al*. 1972. Besides during the period of study a cyst plant parasitic nematode is the first report from Kashmir and a few weeds were also detected in oats field among which *Chenopodium* specie was found as an alternate habitat host of aphids which is a new finding under Kashmir conditions.

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